**Author’s response to reviews**

**Title:** Relationship between oral environment and frailty among older adults dwelling in a rural Japanese community: A cross-sectional observational study

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Dr. Shenuka Singh

Editor

BMC Oral Health

Dear Dr. Singh,

We are resubmitting our revised manuscript, titled “Relationship between oral environment and frailty among older adults dwelling in a rural Japanese community: A cross-sectional observational study” (OHEA-D-18-00353R1) by Yoko Hasegawa, Ayumi Sakuramoto, Hideyuki Sugita, Kana Hasegawa, Nobuhide Horii, Takashi Sawada, Ken Shinmura, and Hiromitsu Kishimoto for publication as an original report in BMC Oral Health.
We are grateful to the reviewers for their time, effort, thoughtful suggestions, and insightful recommendations, which we believe have greatly improved our manuscript. All authors have addressed the reviewers’ comments and have subsequently revised the structure and content of the manuscript.

Thus, the revised manuscript represents a comprehensive revision, as suggested by the reviewers. We feel that these changes have improved the quality and style of this report, and we hope that it is now suitable for publication in your journal. Please find our responses to the reviewers’ comments in the response letter.

I certify that all of the co-authors agree with the revisions of this manuscript.

Respectfully yours,

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Point-by-point response to reviewer
Thank you for your careful review.

As mentioned below, we have indicated our changes according to line and page numbers in the revised manuscript. The indicated text was extracted in yellow highlight, the question from the reviewer is a black character, and our response have been made in blue text.

P2
Thank you for reviewing our study

These responses need to be integrated into the revised manuscript.

- We have integrated the necessary changes into the revised manuscript.

P2L19-20

Conclusion: Our findings indicated that the physical frailty of elderly adults might be affected by oral hygiene status and the condition of the remaining teeth.

Should this not read: oral hygiene status and the condition of the remaining teeth might be affected by ....

- Thank you for your suggestion. We have revised this sentence according to your suggestion (Page 2, Line 13).

P3L23

Examine

Determine?

- We used this term to indicate that this was an “investigation”. However, because it may appear confusing, we have changed “examine” to “assess”.

P3L24

Oral health status?

- According to your suggestion, “their dental characteristics” was changed to “their oral health status”

P3L2-6

The purpose of which the FESTA study is to clarify associations between lifestyle habits and frailty in elderly people. The Hyogo College of Medicine Sasayama Medical Center is a branch hospital of the Hyogo College of Medicine, located in the Tanba-Sasayama area of Hyogo, Japan. Therefore, this study was conducted in the Sasayama area.
Note the tense. The study should be written in the past tense

- As per your suggestion, we have changed the use of present tense to past tense.

P4L17

All participants were independent, apparently healthy elderly adults.

How was this determined? Was there a screening process?

- We apologize that the screening process was not completely clear. In this study, subjects who required a level of care higher than level 1 according to the long-term care insurance system in Japan were excluded. Meanwhile “apparently healthy elderly adults” is unclear. We have revised this sentence to “All participants in this study were independent elderly individuals who required less than level 1 care based on the long-term care insurance system in Japan.” (Page 4, Line 14-15)

P4L19

masked for analysis.

Please explain this. How was responsible for the analysis of the data?

- Personal identifiable information was made anonymous for the study. After each survey, we returned to the Hyogo College of Medicine General Department of Medicine and entered into the consolidation table. After filling out the consolidated table, the shredder was immediately disposed of consolidated information such as memos. The consolidation table that linked personal information and basic ID numbers was managed by a personal information manager (Prof. Masaki Miyamoto, Chief Professor, Department of Medical Informatics, Hyogo College of Medicine) who is not related to this research. All data used in this research were anonymised and then passed to the authors.

P5L5

Include ethical considerations

- According to your suggestion, we have described the details for ethical considerations (Page 5, Line 3-8).
10:00 to 14:00
explain as indicated above.
- In this study, skeletal muscle mass was measured using a body composition monitor (bioimpedance analysis [BIA] method). The BIA method estimates body composition using the differences in resistivity of the substances that make up the living body. Because peripheral moisture affects measurements done by the BIA method, the method was susceptible to the influence of diurnal variation; thus, we limited the survey time. However, this description was deleted because survey time did not affect the results of this survey.

Also indicate infection control measures
- We have added information about infection control measures.

dielectrophoretic impedance

How was this calibrated?
- The instrument matches the impedance (C component value) zero point starting for each measurement. Therefore, there was no need for calibration.

The number of remaining teeth was significantly higher in the robust group than in the frail group.

Results?
- Yes, we have mentioned the results in Table 2.
The salivary bacterial count of the frail group, which had a smaller teeth number of teeth, was significantly smaller than those of the other two groups, suggesting that teeth number of teeth is associated with bacterial count.

Results?

- Yes, we have mentioned the results in Table 2.

A few participants were judged to be cautious (△ in Table 1) or problematic (× in Table 1) with other items, while some were judged to be problematic with only "teeth and dentures" and "dryness and saliva."

Add the main finding in the text

- We have added the main findings according to your suggestion (Page 6, Line 26-27).

To evaluate the influence of medical history on oral hygiene items in Table 3, the participants with worse condition in “teeth and denture” were significantly recognized with hypertension (P = 0.009, χ² 26 test,).

- We have rephrased the above part to make it easier to understand.

There are currently no standardized items and established criteria for evaluating frailty. The most common method uses the Cardiovascular Health Study (CHS) criteria published by Fried et al. [18]. The present study used the KCL to evaluate frailty. The KCL is a simple self-administered questionnaire designed to identify elderly individuals who are at high risk of requiring "long-term care" in Japan.

This belongs in the background to the study.
- We have deleted the repetitive parts based on your suggestion.

P7L8-9

The KCL has also been verified the validity.

To be related to the frail evaluation method “Edmonton Frail Scale” [19].

Grammar.

- We have revised these sentences according to your suggestion.

Has KCL been previously validated in this population?

- No, KCL has not been previously validated.

P7L18-20

Typical oral infectious diseases include dental caries and periodontal disease, wherein dental plaque is the major factor. The plaque forms a bacterial coat to the film called the pellicle on the surface of teeth.

Review this sentence. Add on references. Note the literature on the etiology of dental caries and periodontal disease. These are not the same.

- According to your suggestion, we have revised these sentences (Page 7, Line 21-22) and cited the references.

P7L23 あたり

ラインなし

This is a problematic statement. You need to refer to more literature that reports in the oral biome.

- According to your suggestion, we have added more references (ref. 22-24) regarding the oral microbiome.
The influence of medical history on oral functions and periodontitis was controlled for other known factors associated with cardiovascular diseases, including hypertension.

Explain this clearly

- We have revised this sentence for better clarity (Page 7, Line 27-28).

Salivary flow decreases for a side effect of drug and expects that teeth, and the state of periodontal condition was also bad, teeth and denture condition become dirty consequently.

Note that your target audience will be readers involved in oral health care/training/education/research.

Please use scientific language can is commonly understood in oral health care.

- As suggested, we have revised this sentence using appropriate scientific language (Page 8, Line 3-5).

Our findings indicate that the physical frailty of elderly adults might be associated with oral hygiene status and the condition of the remaining teeth as suggested earlier.

- We have revised this sentence according to your suggestion.